3 Types of Muscle Tissue

Skeletal – attached to bone

Cardiac – the heart

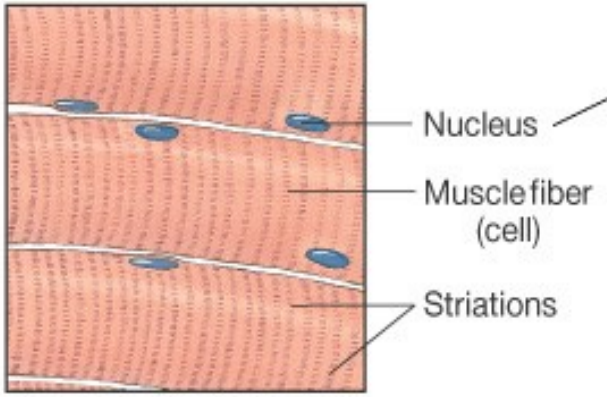
Smooth – internal organs
blood vessels

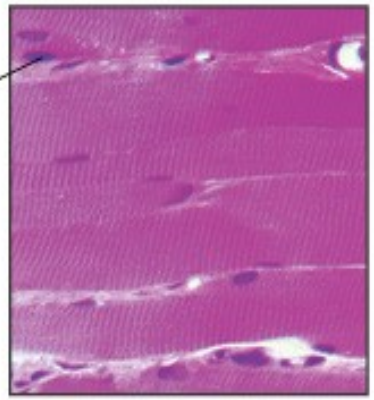
Properties of Muscle Tissue

- Contractility
- Excitability
- Extensibility
- Elasticity

Skeletal muscle

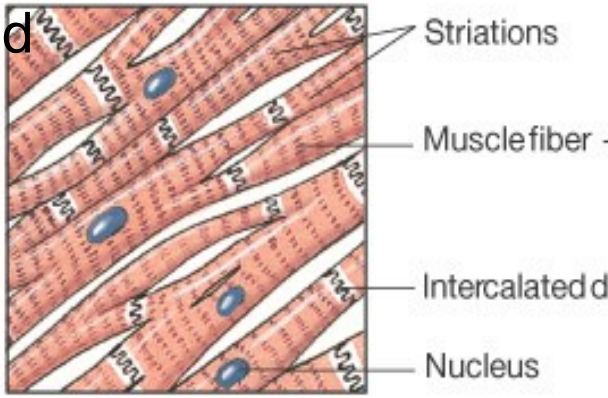
- Long & cylindrical
- Multinucleated
- Striated
- Voluntary





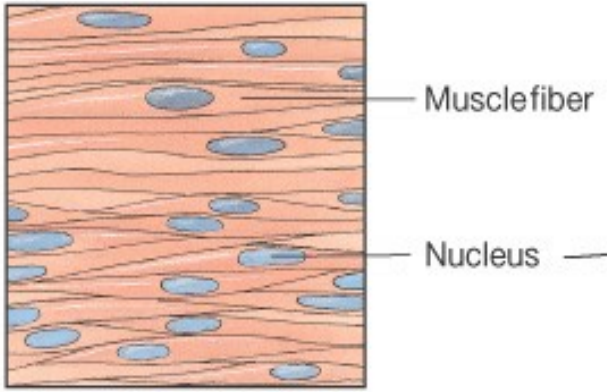
Cardiac muscle

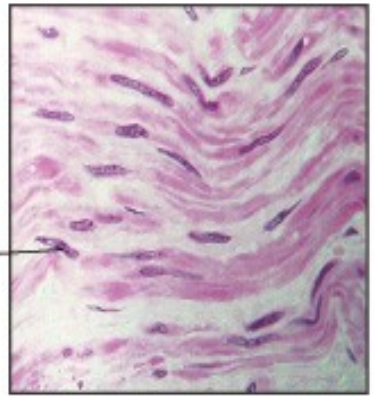
- Shorter & branched
- Uninucleated
- Striated
- Involuntary



Smooth muscle

- Spindle-shaped
- Uninucleated
- Non-striated
- Involuntary





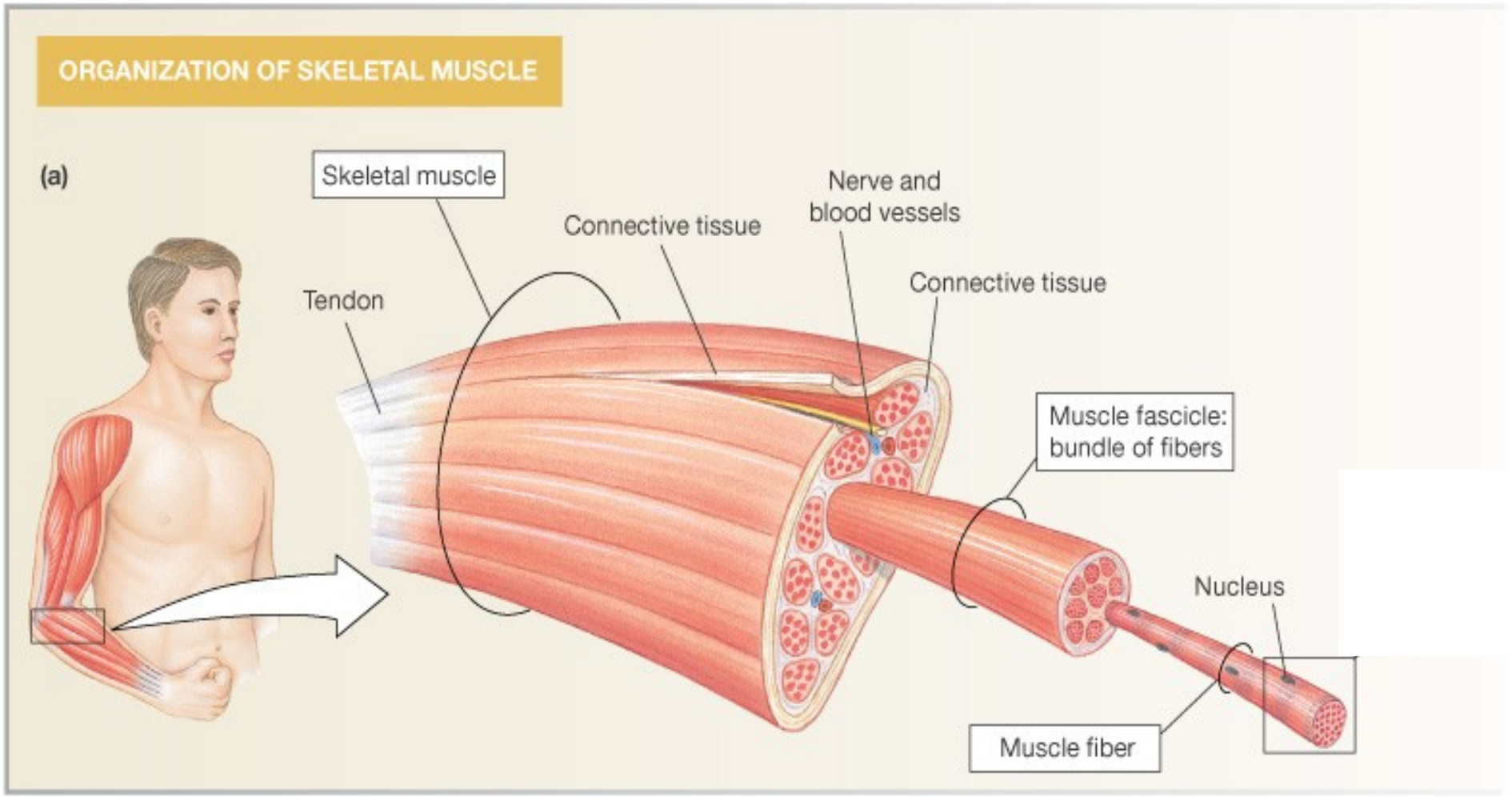
Functions of Skeletal Muscle

- Movement of Body
- Protection
- Heat Production
- Controls Entrances and Exits to Body

Micro-Anatomy of Skeletal Muscle

- Muscle cell = muscle fiber
- Fascicle = bundle of muscle fibers
- Whole muscle = bundle of fascicles

Anatomy of Skeletal Muscle



Connective Tissue of Skeletal Muscle

- Endomysium => covers a muscle fiber
- Perimysium => covers fascicles
- Epimysium => covers whole muscle

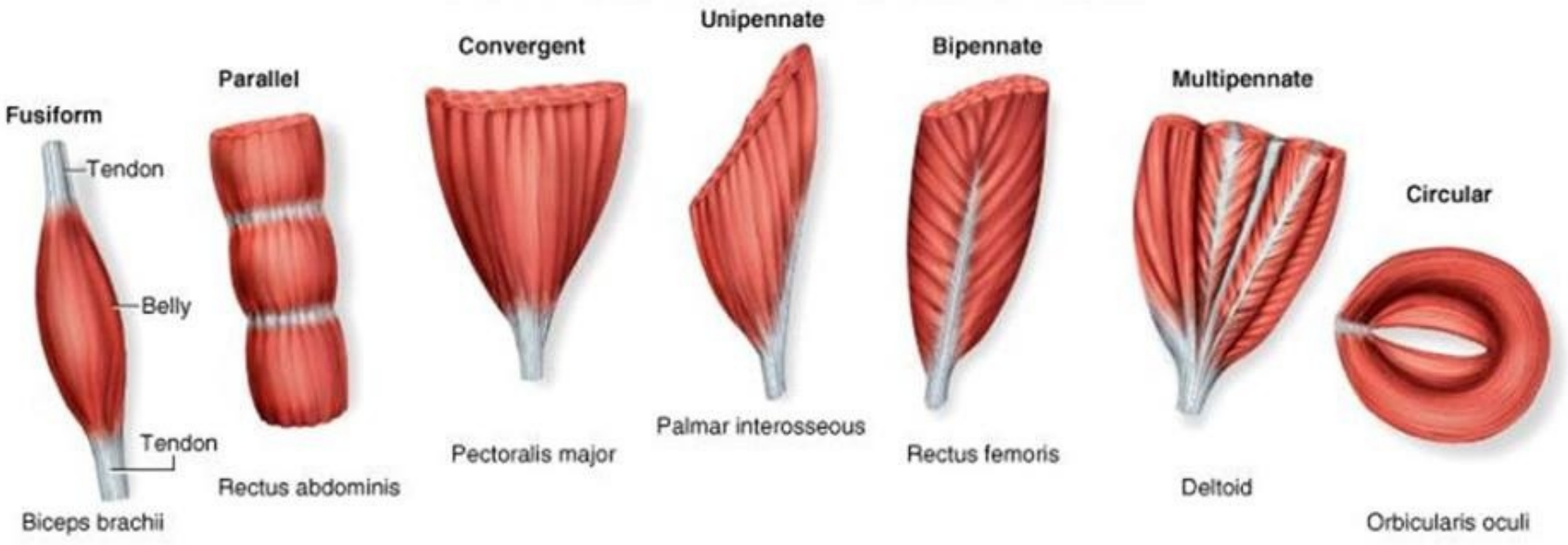
Naming of Skeletal Muscle

- Size
  - Maximus
  - Minimus
  - Major
  - Minor
  - Longus
  - Brevis
- Shape
  - Deltoid (triangle)
  - Teres (round, cylindrical)
  - Trapezius (trapezoidal)
  - Rhomboideus (rhomboidal)

- Location
  - Abdominis
  - Femoris
  - Brachii
  - Capitis
  - Pectoralis
  - Intercostal
  - Digitorum
- Relative Position
  - Lateral
  - Medial
  - Internal
  - External
  - Superficialis
  - Profundis
- Action
  - Abductor
  - Adductor
  - Flexor
  - Extensor
  - Pronator
  - Supinator
  - Levetor
  - Depressor

- Number of Heads
  - Biceps
  - Triceps
  - Quadriceps
- Orientation of Muscle
  - Rectus
  - Transversus
  - Oblique
- Origin and Insertion
  - sternocleidomastoid
  - coracobrachialis
  - Brachioradialis

Classification of Skeletal Muscle by Fascicular Orientation



Classification by Orientation of Fascicles

1) Circular:
   - e.g. orbicularis oris
   - e.g. orbicularis oculi

2) Parallel:

   a) Strap-like: - e.g. sartorius, rectus abdominis

   b) Fusiform (Spindle-shaped): - e.g. biceps brachii

3) Convergent:
   - e.g. pectoralis major
   - e.g. piriformis

4) Pennate Muscles:

a) Unipennate: – e.g. extensor digitorum

b) Bipennate: – e.g. rectus femoris

c) Multipennate: – e.g. deltoid

A Lever System can:

- Increase the force applied to the movement.

OR

- Increase speed or distance of body part moved.

But never both!

Levers **are elongated rigid structures that move on a fixed point,**

called a fulcrum (F).

The role of Lever Systems is to Confer Advantage to Body Movement.

the body **Bones** act as levers.

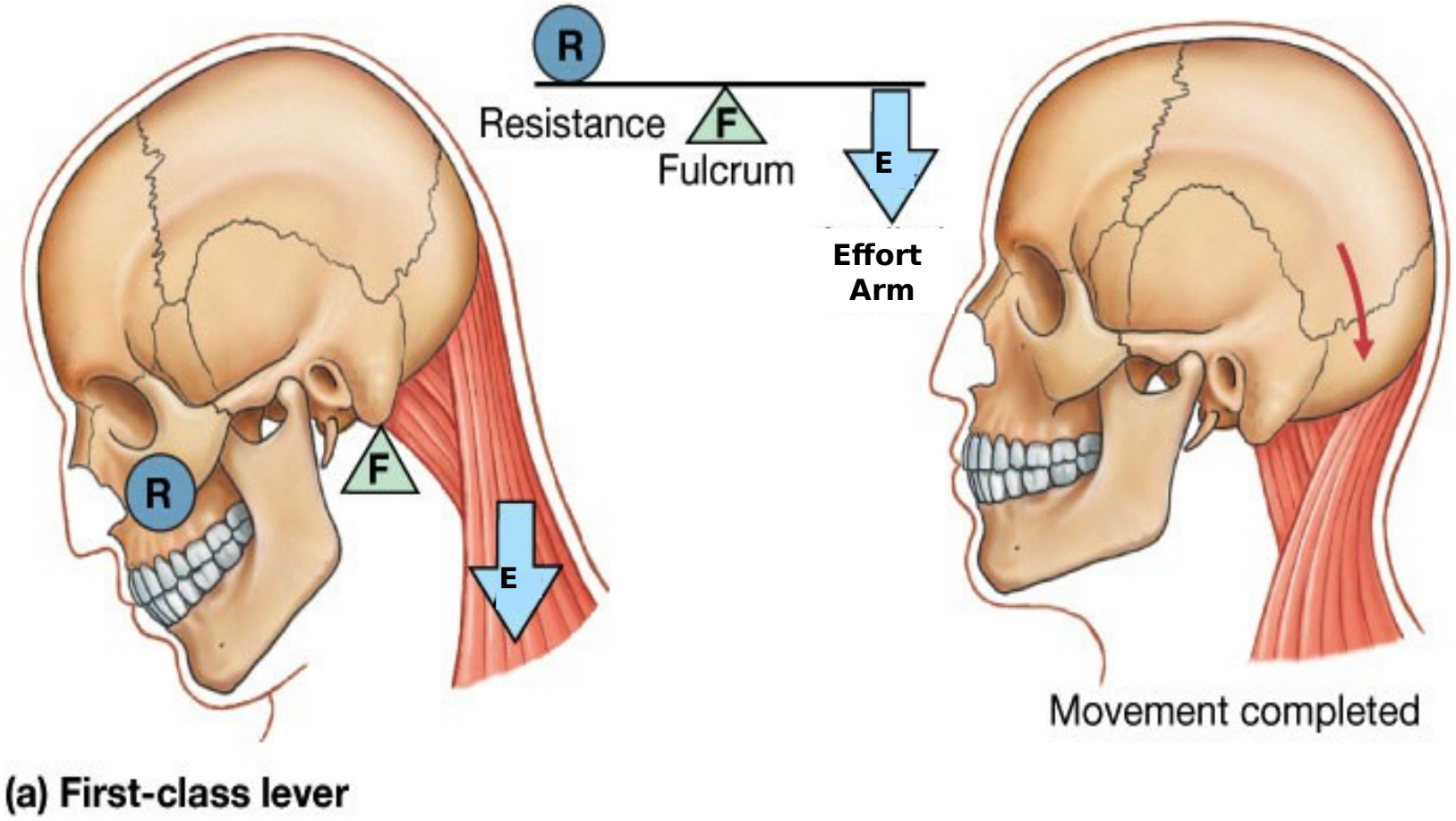
- Movable **Joints** act as the fulcrum (F).
- The **Effort** (**E**) **arm** is powered by muscular contraction.
- The **Resistance** (**R**) is the weight of the body part being moved.

<u>Each Lever System needs a</u>:

Fulcrum, Effort arm and Resistance.

1st Class Lever:

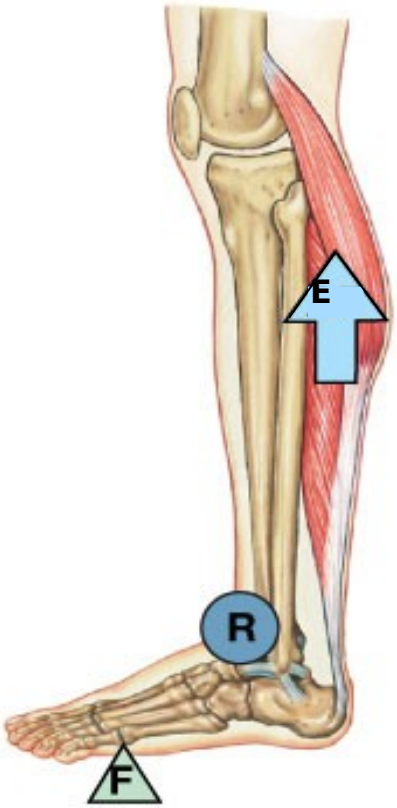
FFR



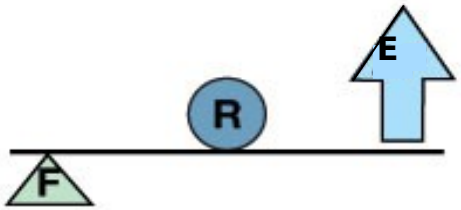
(a) First-class lever

2nd Class Lever:

FRE

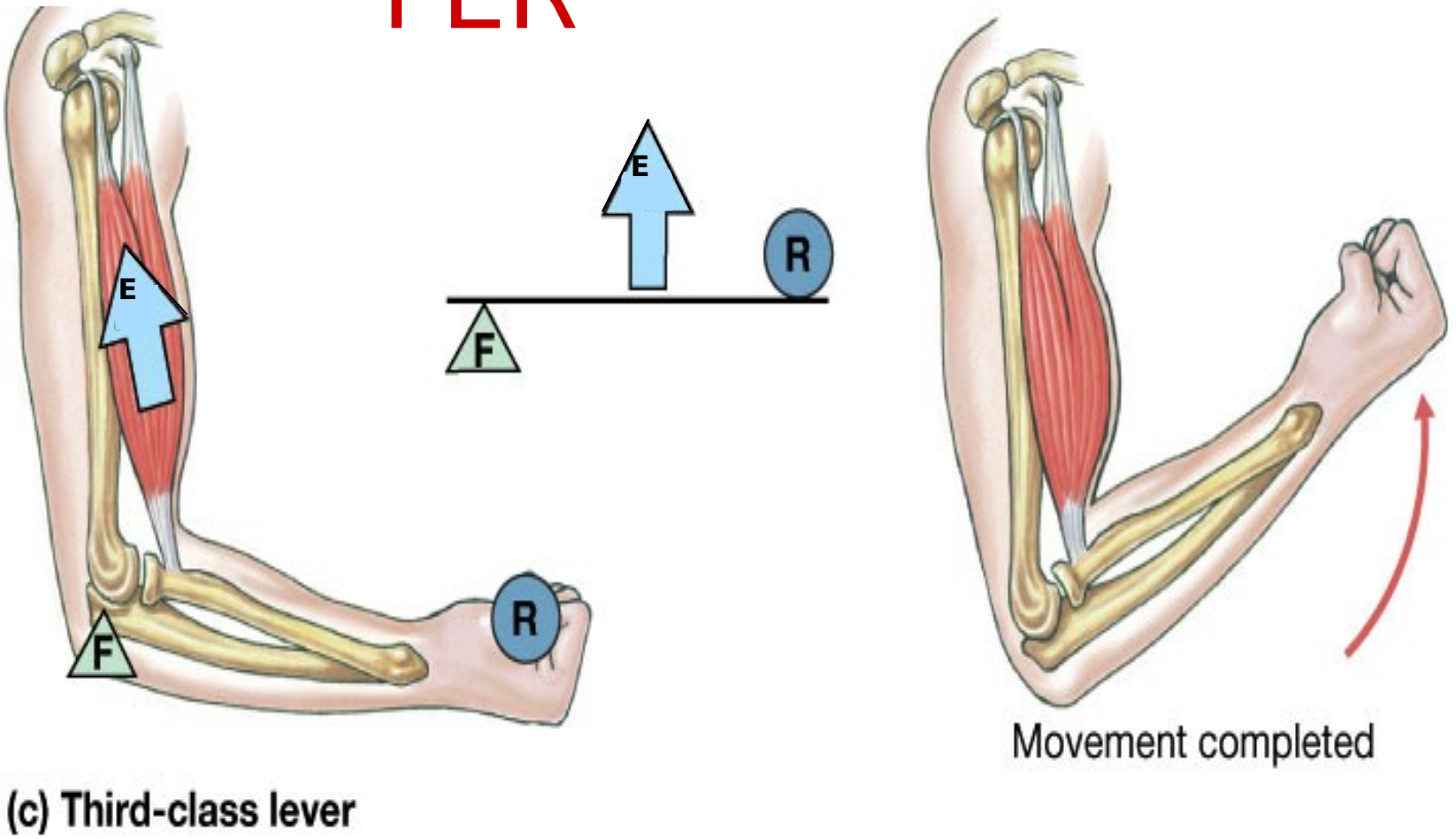


(b) Second-class lever



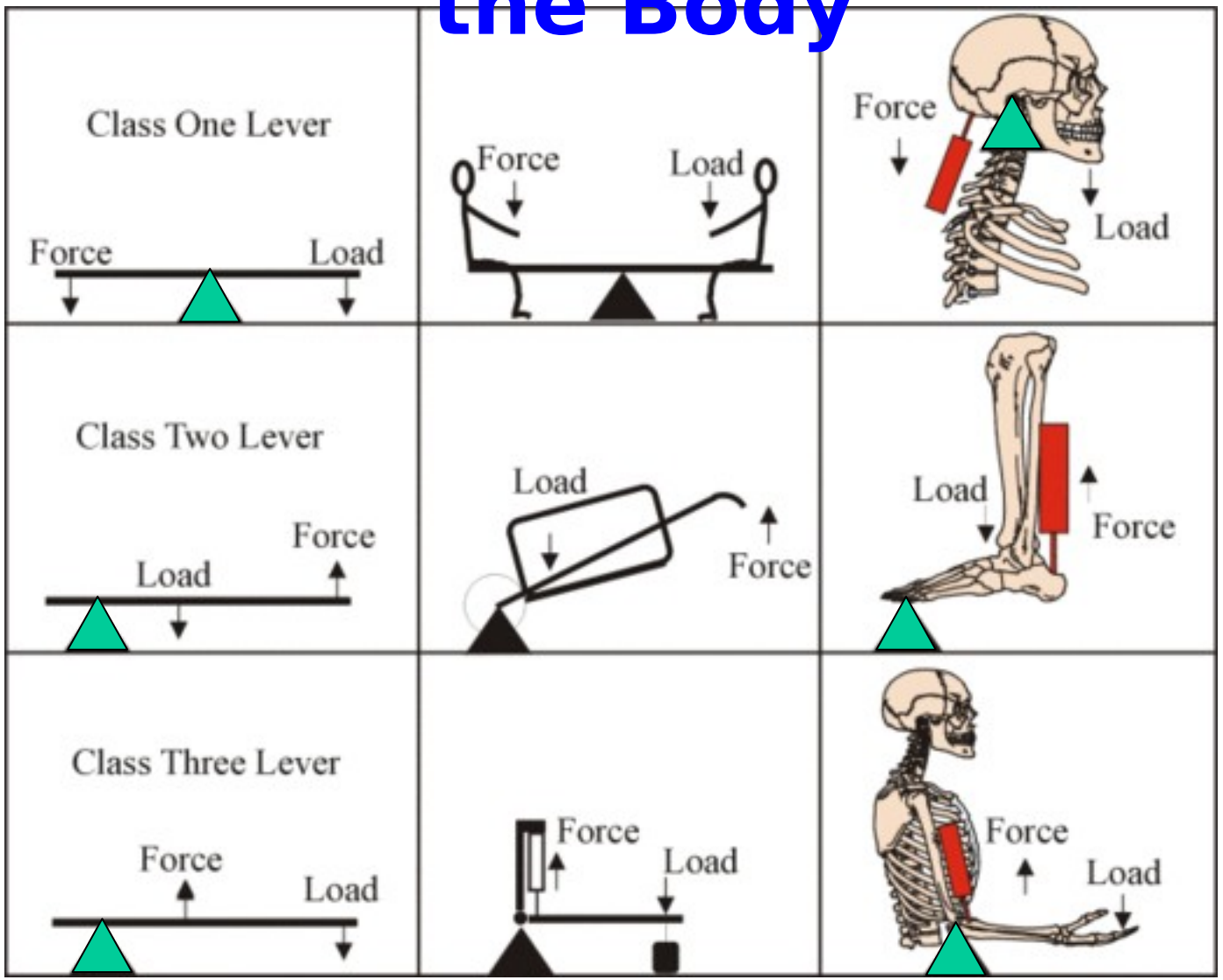
3rd Class Lever:

FER



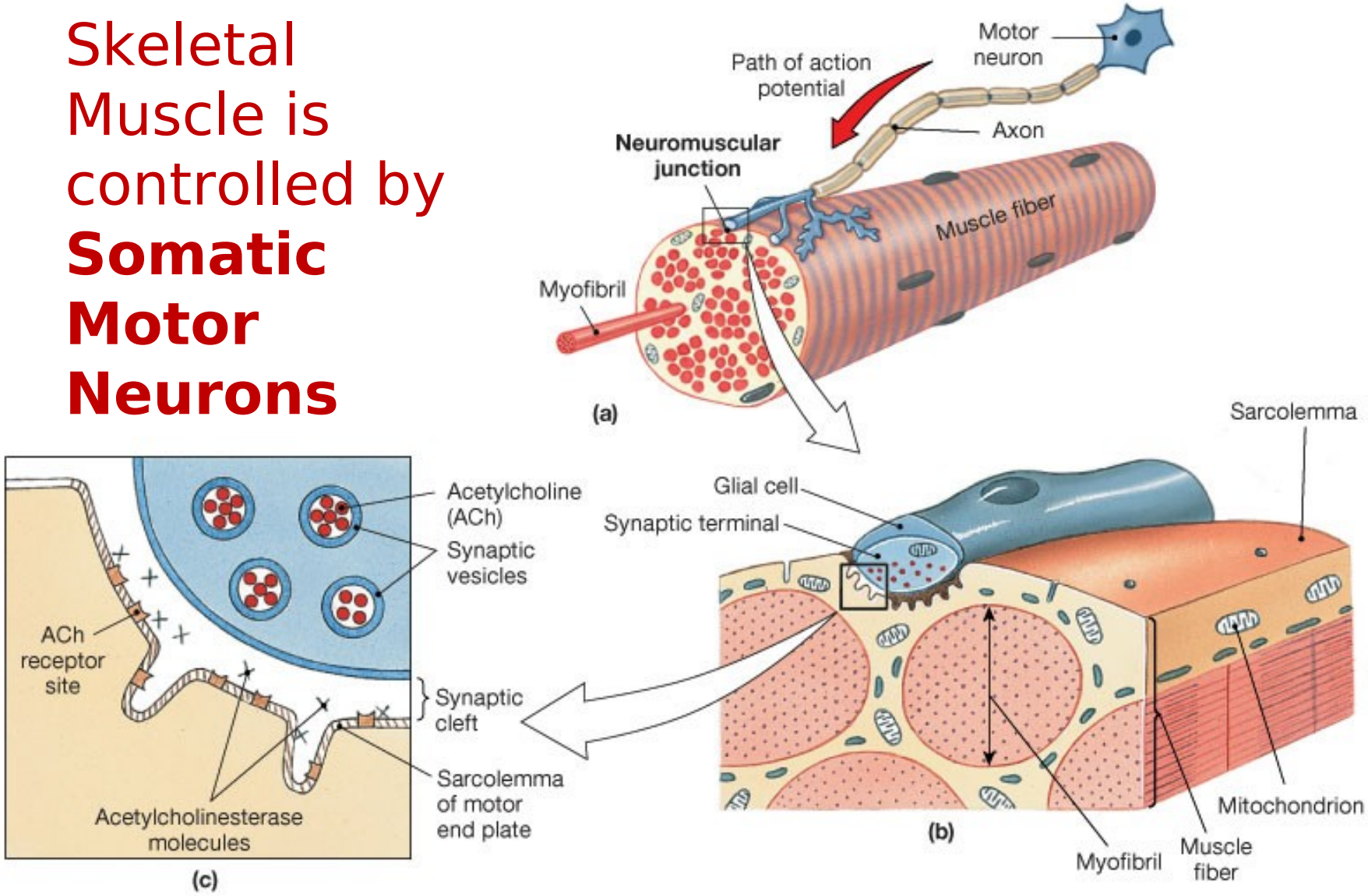
(c) Third-class lever

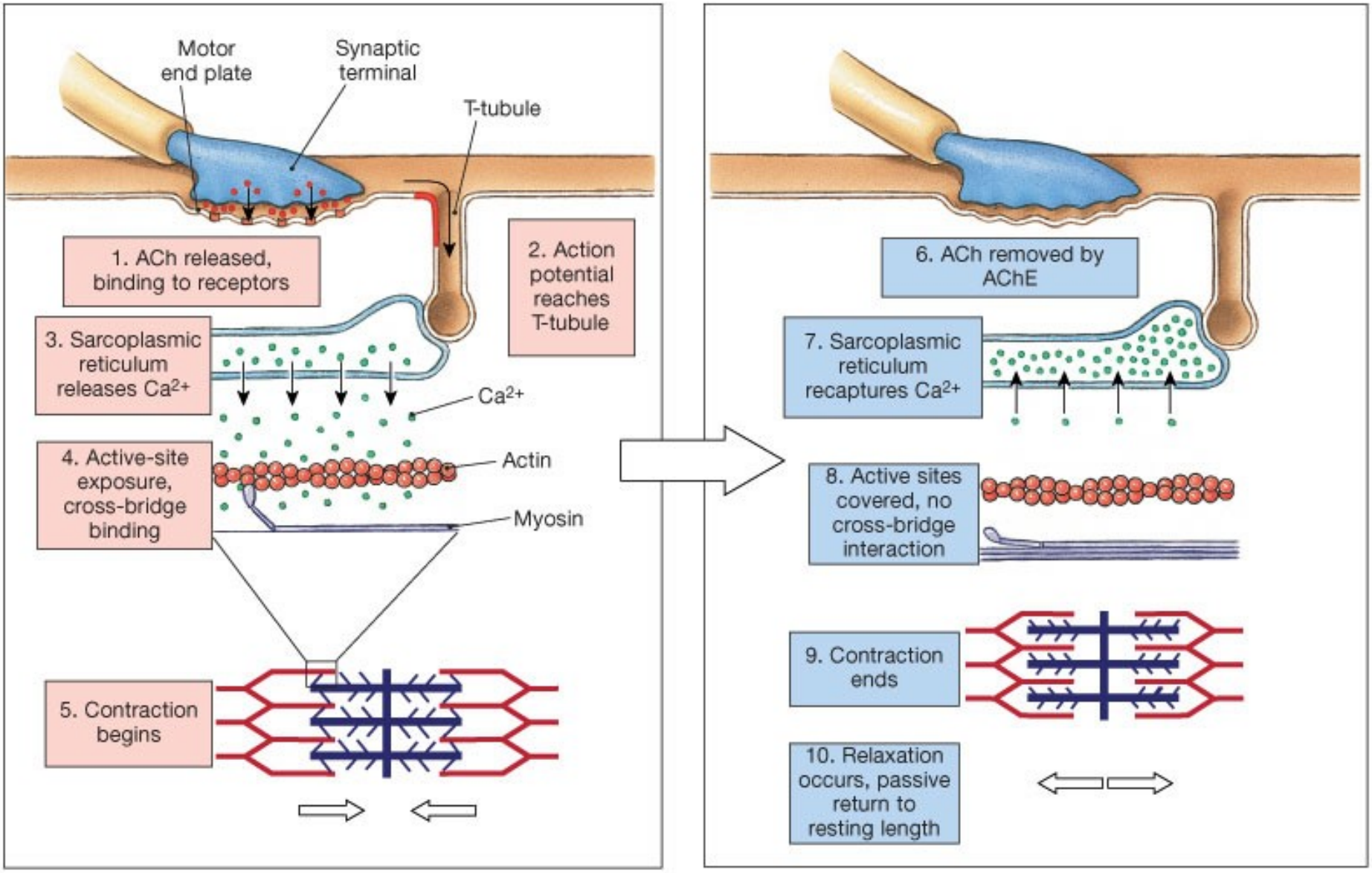
The Mechanics of Levers in the Body



The Neuromuscular Junction

Skeletal Muscle is controlled by **Somatic Motor Neurons**





Steps in the initiation of a contraction

Steps that end the contraction

Motor Unit Recruitment